

SUPPORT FOR THE AMENDMENTS

Claim 14 is amended.

Claims 15-21 are added.

The amendment to Claim 14 is supported by page 19 of the specification. Claims 15-21 are supported by original and previously pending Claim 1 and the specification at pages 2-35, see for example page 5 last line to page 8, line 9.

No new matter is believed to have been entered by the present amendments.

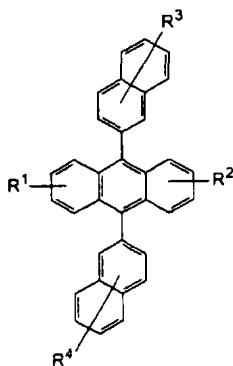
### REMARKS

Claims 1-21 are pending in the present application.

The rejection of Claims 1-5 and 13-14 under 35 U.S.C. §103(a) over EP 1009044 (EP '044) is respectfully traversed.

In making this rejection, the Examiner alleges that EP '044 "teaches at least an overlapping genus, and at least the following anticipatory species" citing to the compound 41. Applicants maintain that this allegation is in error and incorporate herein by reference the remarks set forth on pages 14-22 of the response filed November 17, 2010.

Clearly, the Examiner at least agreed with Applicants to the extent that the anticipation rejection was withdrawn. Now, however, citing compound 41 and the following sub-genus appearing on page 37 the Examiner alleges that the claimed invention is obvious. Specifically, the Examiner alleges that in the following formula of EP '044:



R<sup>3</sup> and R<sup>4</sup> can be individually different groups.

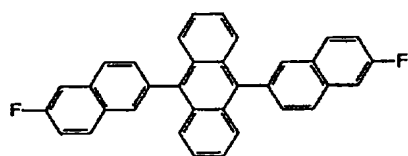
However, EP '044 does not disclose or suggest a compound wherein R<sup>3</sup> and R<sup>4</sup> are different groups except for the compound 41 which is the result of error as explained in great detail in the response filed in November 17, 2010. Thus, contrary to the Examiner's allegations, EP '044 fail to disclose or suggest a compound within the scope of the claims and

fail to disclose or suggest the advantages to be derived from the different R<sup>3</sup> and R<sup>4</sup> groups, i.e., the advantages to be derived from the 9,10-asymmetric anthracene.

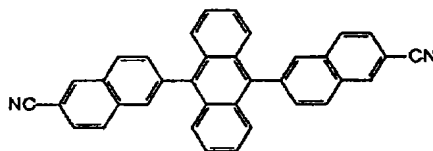
The anthracene derivatives of EP '044 is a material for use in a hole transporting layer (see claims 1 to 11). In contrast, the invention of the present Claims 1–5 and 13–14 is directed to a light emitting material comprising a 9,10-asymmetric anthracene derivative of formula (1).

EP '044 describes nothing about the light emitting properties of the anthracene derivative. Therefore, the skilled artisan reading EP '044 would not expect that the current efficiency and the half lifetime are drastically improved by using the claimed light emitting material comprising a 9,10-asymmetric anthracene derivative.

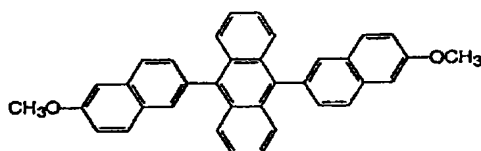
Further, with respect to erroneous compound 41, which the Examiner clings to, Applicants submit the following repeated explanation. Specifically, compound 41 (as well as compounds 42 and 43) is the result of errors in the preparation of the EP specification from the priority application US 09/208,172 (filed December 9, 1998). Evidence of the correct structure for compound 41 (as well as compounds 42 and 43) is provided by the copy of the certified priority application filed November 17, 2010 in this application, which was filed in the EP application on November 25, 1999, at pages 23-24. As shown on pages 23-24 of the priority application US 09/208,172, compounds 41-43 should have the following structures:



Compound 41

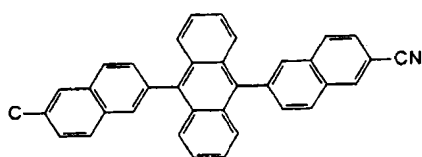


Compound 42

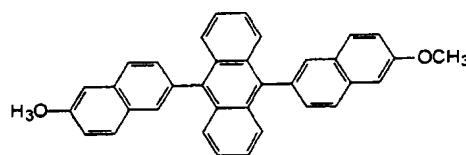


Compound 43

Further evidence of the errors come from facial consideration of the structures published in EP '044 for compounds 42 and 43, which violate the basic rules of chemistry. As published, compounds 42 and 43 of EP '044 appear as follows:



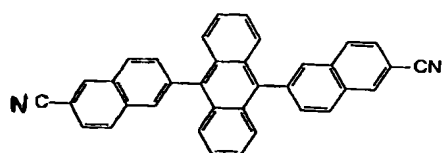
Compound 42



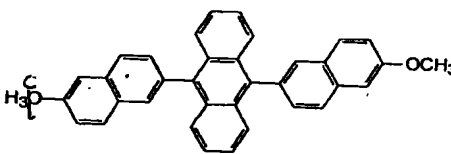
Compound 43

Clearly, the valence of carbon in compound 42 is unsatisfied and the a "H<sub>3</sub>O-" group is not possible.

The patentee of EP '044 acknowledged the errors in compounds 41, 42, and 43 on page 2 of the response filed on December 15, 2008 (dated December 11, 2008), a copy of which was filed November 17, 2010 in this application. Also with the response filed December 15, 2008, the patentee of EP '044 filed an amendment to the specification to correct the structures compounds 42 and 43. In compound 42, left side "C-" is amended to "NC-", whereby the compound 42 becomes symmetrical. In compound 43, left side "H<sub>3</sub>O-" is amended to "CH<sub>3</sub> O-", whereby the compound 43 becomes symmetrical. The amendments to page 23 of the original European specification filed on December 15, 2008, a copy **submitted herewith**, are as follows:



Compound 42



Compound 43

In the response filed on December 15, 2008, the patentee of EP '044 states with respect to compounds 41, 42, and 43:

Finally the structure of compound 12 has been corrected as it is clear to any chemist that this cannot be an 'F<sub>3</sub>' group but should be '-CF<sub>3</sub>' in line with the other three -CF<sub>3</sub> groups. Compound 42 cannot have a '-C' atom and is clearly intended to be -CN as on the other side of the molecule. Substitution on Compound 43 on both pages 23 and 31 cannot be '-O<sub>3</sub>H' but is unequivocally -OCH<sub>3</sub> as this compound is named as 9,10-di-[2-(6-methoxy-naphthyl)] anthracene on page 40, line 11. Analogously compound 7 on page 14 clearly should have a -OCH<sub>3</sub> group on the 'left-hand' side of the molecule and not the chemically incorrect -OH<sub>3</sub> group.

In fact compounds 13 and 41 were fairly obviously intended to have a 'F' substitution on the 'left-hand' ring. However these corrections have not been made at this time as there is an argument that these structures are chemically possible as the bond could represent a methyl group. However, even though it is understood that one cannot use the priority document on which to base a correction, if the Examiner recognises the clear symmetry of the many compounds specified and the obvious intent, coupled with the many obvious printing errors on the 'left-hand' side of molecules, it would be appreciated if consideration could be given to correcting these two structures as well.

While the publication of compounds 42 and 43 in EP '044 was also an error by the EPO as the specification was amended during examination, in compound 41, the left side "- is an error in writing, and it should be "F-" as shown in US 2002/0028346 A1 and US 6,465,115B2. It is clear that compounds 41, 42, and 43 were never intended by the patentee, were never produced by the patentee, and only appeared as a result of error.

Thus, compounds 41, 42 and 43 have a structure in which 2-naphthyl group is symmetrically connected to 9- and 10-positions in anthracene ring. Compounds 26-30 and 36-40 (10 compounds) also have such the structure. Also, in the 10 compounds, the same 2-

naphthyl group are symmetrically connected to 9- and 10-positions in anthracene ring. And as described above, the compounds 42 and 43 were amended to be symmetrical.

The Examiner obfuscates the clear statement by the patentee of EP '044 in the Office Action alleging that the methyl group was contemplated and chemically valid. However, the question of chemical validity is different from what is clearly taught by and/or apparent from the disclosure in EP '044. Clearly, from the disclosure and the prosecution history of EP '044, US 2002/0028346 A1 and/or US 6,465,115B2, the skilled artisan would be aware of the error of the compound 41 and he or she is aware that substituted groups at 9- and 10-positions in anthracene ring are identical to each other regardless of substituted groups (-F, -CN, and -OCH<sub>3</sub> in the compounds 41-43) connected to 2-naphthyl group.

In view of the foregoing, Applicants submit that EP '044 does not disclose a preparation process of the 9,10-asymmetric anthracene derivatives, and the EP '044 does not disclose how to prepare the compounds 41, 42, and 43 having the incorrectly published structures, or any other 9,10-asymmetric anthracene compounds. Accordingly, the skilled artisan in possession of EP '044 would not be led to an 9,10-asymmetric anthracene compound based on the disclosure of EP '044. As such, EP '044 does not render the claimed invention obvious.

Withdrawal of this ground of rejection is requested.

The rejections of (A) Claims 1-6 and 12-14 under 35 U.S.C. §103(a) over JP 11323323 (JP '323) and (B) Claims 1-6 and 12-14 under 35 U.S.C. §103(a) over JP 11323323 in view of US 2003/008524 (US '524) is respectfully traversed.

In the response filed November 17, 2010, Applicants argued and maintain that there is no reasonable basis to make modifications of the 9,10-symmetric compounds disclosed in JP '323 to arrive at the claimed compounds, because there were no unsymmetrical examples and there were no methods of making a 9,10-asymmetric anthracenes.

The Examiner acknowledges that JP '323 fails to teach a 9,10-asymmetric anthracene. However, the Examiner maintains the rejection alleging:

However, the skilled artisan is a skilled organic chemist. At least example at page [0039] of the '323 publication for example (machine translation) teaches the anion addition to butylanthroquinone. A skilled artisan with this level of skill understands stoichiometry and that one equivalent of different nucleophiles could be added in subsequent steps.

However, what is important is not the fact whether the skilled artisan *could* make a 9,10-asymmetric anthracene, but the fact whether JP '323 suggests any benefits of a 9,10-asymmetric anthracene and fact whether the skilled artisan is motivated to modify the 9,10-symmetric anthracene of JP '323 to a 9,10-asymmetric anthracene to reach the claimed compounds.

At best, this rationale employed by the Examiner would be that JP '323 could be taken as an "invitation to experiment" or could be viewed as providing an "obvious to try" argument. However, "obvious to try" has long been held not to constitute obviousness. *In re O'Farrell*, 7 USPQ2d 1673, 1680 81 (Fed. Cir. 1988). A general incentive does not make obvious a particular result, nor does the existence of techniques by which those efforts can be carried out. *In re Deuel*, 34 USPQ2d 1210, 1216 (Fed. Cir. 1995).

*KSR International Co. v. Teleflex Inc.*, 550 U.S.\_\_\_\_, 82 USPQ2d 1385 (2007) does not eliminate the "obvious to try is not obvious" standard, as it clearly states that "obvious to

try” may constitute obviousness, but only under certain circumstances. Specifically, *KSR* stated that the fact that a claimed combination of elements was “obvious to try” might show that such combination was obvious under 35 U.S.C. § 103, since, if there is design need or market pressure to solve problem, and there are finite number of identified, predictable solutions, person of ordinary skill in art has good reason to pursue known options within his or her technical grasp, and if this leads to anticipated success, it is likely product of ordinary skill and common sense, not innovation. However, the Examiner offers nothing to show how these factors apply and whether there would be such an expectation or anticipated success.

The fact of the matter remains, there must be some reasonable expectation of success. To this end, “the prior art can be modified or combined to reject claims as *prima facie* obvious as long as there is a reasonable expectation of success.” *In re Merck & Co., Inc.*, 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986). In the case at issue, the Examiner has not proffered any evidence to support an allegation that a reasonable expectation of success.

Moreover, JP '323 is completely silent about the 9,10-symmetry and 9,10-asymmetry of the anthracene compound and fails to teach a 9,10-asymmetric anthracene, much less the benefits to be achieved by a 9,10-asymmetric anthracene. Therefore, the mere fact that the skilled artisan could make a 9,10-asymmetric anthracene does not make such a modification obvious.

The Examiner states at page 12, lines 1–2 that a claim drafted commensurate in scope with the results would overcome an obviousness rejection. In accordance with the Examiner’s view, the new claims 15 and 16 wherein the variables of formula (1) are limited have been added. Thus, minimally, acknowledgement of the allowability of Claims 15 and 16 is requested.

However, Applicants maintain that the broader scope of Claims 1-6 and 12-14 are also allowable because:

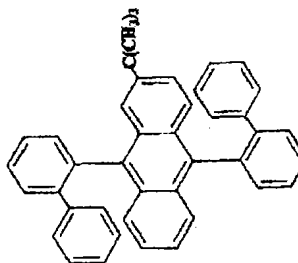


- (1) JP '323 is completely silent about the 9,10-asymmetric anthracene,
- (2) JP '323 provides only the properties of anthracene compounds per se and does not describe the performance of a device comprising the anthracene compound, and
- (3) the 9,10-asymmetric anthracene compounds exhibit a high current efficiency and a long half lifetime unexpected from the 9,10-symmetric compound (see the Declaration under 37 C.F.R. § 1.132 **submitted herewith**).

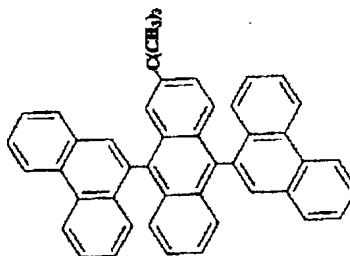
Indeed, as set forth in the response filed November 17, 2010, none of these references provide any examples of a 9,10-asymmetric anthracene compound within the scope of the claimed invention, nor do these references disclose a method of making a 9,10-asymmetric anthracene compounds. Accordingly, absent Applicants' disclosure the artisans would not have any reasonable basis to make the modifications of the compounds disclosed in these reference to arrive at a 9,10-asymmetric anthracene compound within the scope of the claimed invention. Further, a 9,10-asymmetric anthracene compound as claimed is not "structurally similar" to a 9,10-symmetric anthracene compound such that a reasonable basis exists to conclude similar properties would exist between these "similar" compounds.

The exemplified compounds of EP '044 are cited above, while the exemplified compounds of JP '323 are as follows:

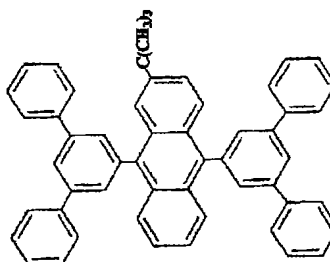
Example 1



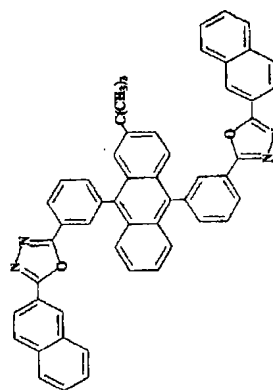
Example 2



Example 3



Example 4



As was the case with EP '044, neither JP '323 nor US '524 disclose or suggest a preparation process for 9,10-asymmetric anthracene derivatives. This is an important deficiency in the disclosures of EP '044, JP '323, and US '524 as the process for producing 9,10-asymmetric and 9,10-symmetric anthracene derivatives are quite different.

Compared with the preparation of 9,10-symmetric anthracene derivatives, the preparation of 9,10-asymmetric anthracene derivatives accompanies by difficulty from viewpoint of preparation technologies. For example, a preparation process of 9,10-asymmetric anthracene derivatives includes an increased number of reaction stages, because 9,10-asymmetric anthracene derivative has to be separated from a mixture of 9,10-symmetric

anthracene derivative with 9,10-asymmetric anthracene derivative, requiring an additional reaction stage. The complexities of these processed can be understood by reference to the present specification and US 2007/0108892, while Journal of Organic Chemistry, 2008, 73, 4326-4329 (copy submitted November 17, 2010) illustrates a preparation process for 9,10-symmetric compounds (anthracene derivatives).

Thus, contrary to the allegations by the Examiner, it would not have been obvious to simply modify the exemplary compounds of JP '323 (or EP '044), even when looking at US '524, to arrive at a 9,10-asymmetric anthracene derivative as claimed. Specifically, the skilled artisan would not have been motivated to produce 9,10-asymmetric anthracene derivatives, because the preparation processes known at the time the present invention was made were directed to the production of 9,10- symmetric compounds and this is all that is provided in the cited art.

Applicants again submit that even if a *prima facie* case were made, "[a] *prima facie* case of obviousness ... is rebuttable by proof that the claimed compounds possess unexpectedly advantageous or superior properties." See MPEP §2144.09 (citing *In re Paesch*, 315 F.2d 381 (C.C.P.A. 1963)). Rebuttal evidence may consist of a showing that the claimed compound possesses unexpected properties. *In re Dillon*, 919 F.2d 688, 692-3, 16 USPQ2d 1897, 1901 (Fed. Cir. 1990). "Evidence that a compound is unexpectedly superior in one of a spectrum of common properties . . . can be enough to rebut a *prima facie* case of obviousness." No set number of examples of superiority is required. *In re Chupp*, 816 F.2d 643, 646, 2 USPQ2d 1437, 1439 (Fed. Cir. 1987)"

With the foregoing in mind, Applicants direct the Examiner's attention to Table 1 on page 42 of the specification. For ease of reference, Applicants provide the following table based on Table 1 on page 42 of the specification, which has been modified to include the structures:

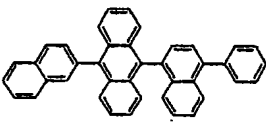
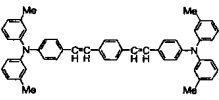
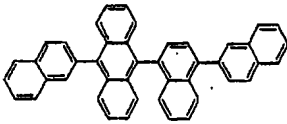
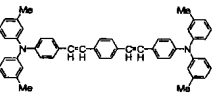
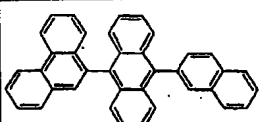
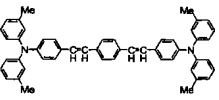
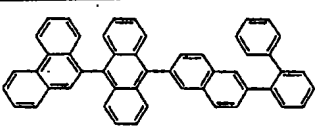
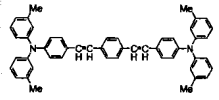
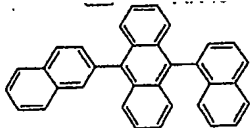
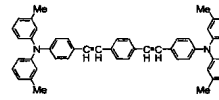
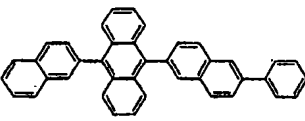
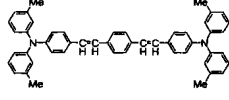
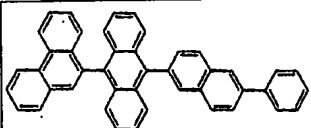
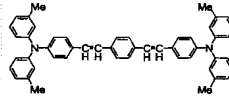
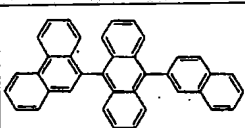
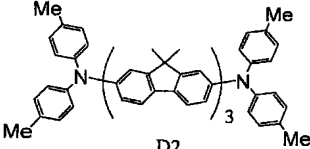
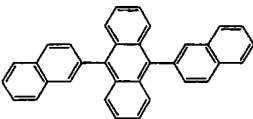
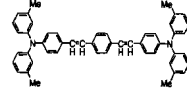
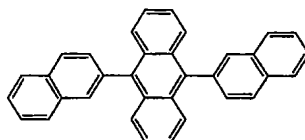
	Host compound No.	Dopant	Current efficiency (cd/A)	Half Lifetime (hours)
Example 1 [Production Example 1]	 AN7	 D1	10.9	4,200
Example 2 [Production Example 2]	 AN8	 D1	10.8	4,200
Example 3 [Production Example 3]	 AN11	 D1	11.0	5,800
Example 4 [Production Example 4]	 AN13	 D1	10.8	3,700
Example 5 [Production Example 5]	 AN44	 D1	10.0	3,000
Example 6 [Production Example 6]	 AN8	 D1	10.1	3,300
Example 7 [Production Example 7]	 AN12	 D1	10.8	4,900
Example 8 [Production Example 3]	 AN11	 D2	10.3	3,700
Comparative Example 1	 an1	 D1	9.0	2,200

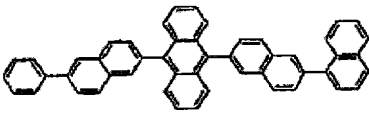
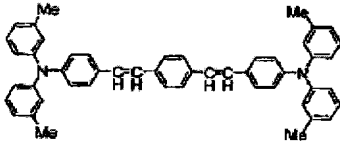
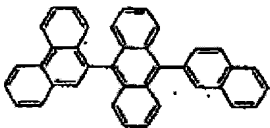
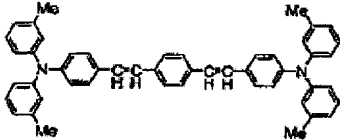
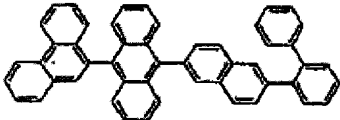
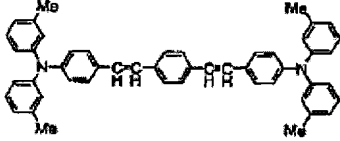
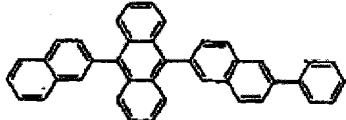
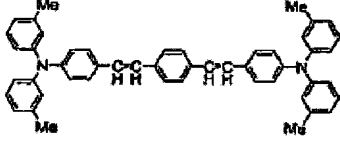
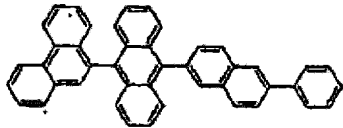
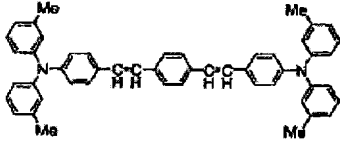
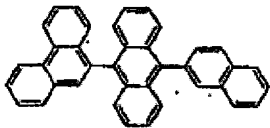
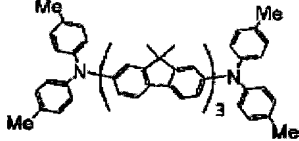
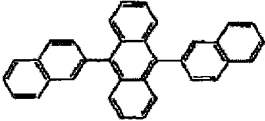
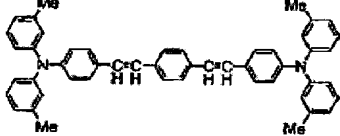
Table 1 shows that Examples using 9,10-asymmetric anthracene derivative have a superior current efficiency and half lifetime as compared with Comparative Example 1 using 9,10-symmetric anthracene derivative (exemplary of the compounds of the cited art). With respect to the relevance of the evidence to the cited art, “an1” corresponds to the compound 26 in the EP ‘044, and it corresponds to “ADN” in US 2003/0068524. The compounds 41-43 are also similar to the “an1” which show poor current efficiency and half lifetime. Accordingly, Applicants submit that the claimed 9,10-asymmetric anthracene derivatives are unexpectedly superior to the 9,10-symmetric anthracene derivatives disclosed in the cited art.

As was the case with JP ‘323, US ‘524 discloses or suggests nothing about the 9,10-asymmetric anthracene derivatives. US ‘524 discloses the following compound:



as a preferred host material.

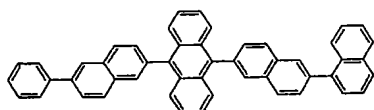
Now, in addition to the foregoing, Applicants **submit herewith** a new Declaration under 37 C.F.R. §1.132 to show the effect of the different substituents at 9- and 10- positions of the anthracene ring. Specifically, on page 3, the declarant provides the table:

Light-Emitting Layer		Current Efficiency (cd/A)	Half Lifetime (h)
host	dopant		
<b>Experiment</b>			
AN40 	D1 	10.7	7,500
<b>Examples</b>			
3 AN11 	D1 	11.0	5,800
4 AN13 	D1 	10.8	3,700
6 AN6 	D1 	10.1	3,300
7 AN12 	D1 	10.8	4,900
8 AN11 	D2 	10.3	3,700
<b>Comparative Example</b>			
1 an1 	D1 	9.0	2,200

Upon comparing Experiment and Example 6 with Comparative Example 1 in the table above, the current efficiency and half lifetime are drastically improved by the 9,10-asymmetric anthracene as compared with the 9,10-symmetric anthracene taught by US '524.

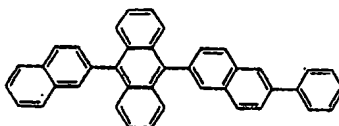
Experiment

AN40



Example 6

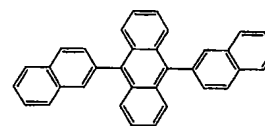
AN6



Comparative Example 1

US '524

an1



Since US '524 is completely silent about the 9,10-asymmetric anthracene, the skilled artisan cannot be motivated to modify the 9,10-symmetric anthracene of US '524 to reach the claimed 9,10-asymmetric anthracene, even if the skilled artisan could make a 9,10-asymmetric anthracene. Therefore, US '524 cannot remedy the deficiency of JP '323.

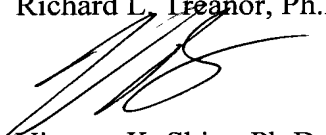
In view of the foregoing, withdrawal of these grounds of rejection is requested. .

Applicants submit that the present application is now in condition for allowance.

Early notification of such action is earnestly solicited.

Respectfully submitted,

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